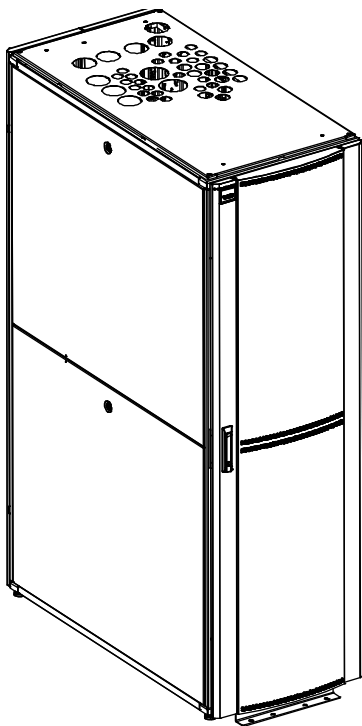


NetSure™ 9500 120kW 400V DC Power System

Installation Manual, IM584001200 (Issue AA, April 14, 2014)

Specification Number: 584001200

Model Number: 9500



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Admonishments Used in this Document



DANGER! Warns of a hazard the reader **will** be exposed to that will **likely** result in death or serious injury if not avoided. (ANSI, OSHA)



WARNING! Warns of a potential hazard the reader **may** be exposed to that **could** result in death or serious injury if not avoided. This admonition is not used for situations that pose a risk only to equipment, software, data, or service. (ANSI)



CAUTION! Warns of a potential hazard the reader **may** be exposed to that **could** result in minor or moderate injury if not avoided. (ANSI, OSHA) This admonition is not used for situations that pose a risk only to equipment, data, or service, even if such use appears to be permitted in some of the applicable standards. (OSHA)



ALERT! Alerts the reader to an action that **must be avoided** in order to protect equipment, software, data, or service. (ISO)



ALERT! Alerts the reader to an action that **must be performed** in order to prevent equipment damage, software corruption, data loss, or service interruption. (ISO)



FIRE SAFETY! Informs the reader of fire safety information, reminders, precautions, or policies, or of the locations of fire-fighting and fire-safety equipment. (ISO)



SAFETY! Informs the reader of general safety information, reminders, precautions, or policies not related to a particular source of hazard or to fire safety. (ISO, ANSI, OSHA)

Important Safety Instructions

General Safety



DANGER!

YOU MUST FOLLOW APPROVED SAFETY PROCEDURES.

Performing the following procedures may expose you to hazards. These procedures should be performed by qualified technicians familiar with the hazards associated with this type of equipment. These hazards may include shock, energy, and/or burns. To avoid these hazards:

- The tasks should be performed in the order indicated.
- Remove watches, rings, and other metal objects.
- Prior to contacting any uninsulated surface or termination, use a voltmeter to verify that no voltage or the expected voltage is present. Check for voltage with both AC and DC voltmeters prior to making contact.
- Wear eye protection.
- Use certified and well maintained insulated tools. Use double insulated tools appropriately rated for the work to be performed.
- Do not work on an energized system without full arc flash and PPE protection.



DANGER! All power and control wiring should be installed by a qualified electrician. All power and control wiring must comply with the National Electrical Code (NEC) and applicable local codes. For operation in countries where the NEC is not recognized, follow applicable codes.

Voltages

AC Input Voltages



DANGER! This system operates from AC input voltage capable of producing fatal electrical shock. AC input power must be completely disconnected from the branch circuits wiring used to provide power to the system before any AC electrical connections are made. Follow local lockout/tagout procedures to ensure upstream branch circuit breakers remain de-energized during installation. DO NOT apply AC input power to the system until all electrical connections have been completed and checked.

DC Output and Battery Voltages



DANGER! This system produces DC Power and may have a battery source connected to it. The DC voltage IS hazardously high and the rectifiers and/or battery can deliver large amounts of current. Exercise extreme caution not to inadvertently contact or have any tool inadvertently contact an output terminal or battery terminal or exposed wire connected to an output terminal or battery terminal. NEVER allow a metal object, such as a tool, to contact more than one termination or battery terminal at a time, or to simultaneously contact a termination or battery terminal and a grounded object. Even a momentary short circuit can cause sparking, explosion, and injury.

Follow local lockout/tagout procedures to ensure DC branch circuit breakers remain de-energized during installation at loads, as required.

Extreme caution is required when performing maintenance. Be constantly aware that this system contains high DC as well as AC voltages.

The maximum output voltage is 400V DC and is potentially lethal.

Check for voltage with both AC and DC voltmeters prior to making contact.

Battery (if equipped)



DANGER! When connected together, the battery terminal voltage is 400V DC and is potentially lethal. Battery strings should be isolated from the power system before servicing.



WARNING! Correct polarity must be observed when connecting battery leads.



WARNING! Special safety precautions are required for procedures involving handling, installing, and servicing batteries. Observe all battery safety precautions in this manual and in the battery instruction manual. These precautions should be followed implicitly at all times.



WARNING! A battery can present a risk of electrical shock and high short circuit current. Servicing of batteries should be performed or supervised only by properly trained and qualified personnel knowledgeable about batteries and the required precautions.

The following precautions should be observed when working on batteries:

- Remove watches, rings, and other metal objects.
- Eye protection should be worn to prevent injury from accidental electrical arcs.
- Use certified and well maintained insulated tools. Use double insulated tools appropriately rated for the work to be performed. Ensure that wrenches with more than one working end have only one end exposed.
- Do not lay tools or metal parts on top of batteries.
- Disconnect charging source prior to connecting or disconnecting battery terminals.
- Risk of explosion if battery is replaced with an incorrect type or if polarity is reversed. When replacing batteries, replace with the same manufacturer and type, or equivalent.
- Dispose of used batteries according to the instructions provided with the batteries. Do not dispose of batteries in a fire. They may explode.
- ALWAYS FOLLOW THE BATTERY MANUFACTURER'S RECOMMENDATIONS AND SAFETY INSTRUCTIONS.

In addition to the hazard of electric shock, gas produced by batteries can be explosive and sulfuric acid can cause severe burns. Do not open or mutilate batteries. Released electrolyte is harmful to the skin and eyes, and is toxic. If electrolyte comes into contact with skin, the affected area should be washed immediately with large amounts of water.



DANGER! This equipment may be used in conjunction with lead-acid batteries. Working near lead-acid batteries is dangerous!

- Batteries contain sulfuric acid.
- Batteries generate explosive gases during normal operation. Systems containing batteries should never be installed in an airtight room or space. Only install in a ventilated environment.
- Batteries are an energy source that can produce high amounts of electrical current.

FOR THESE REASONS, IT IS OF CRITICAL IMPORTANCE THAT YOU READ THESE INSTRUCTIONS AND FOLLOW THEM EXACTLY.

WHEN WORKING WITH LEAD-ACID BATTERIES:

- Wear complete protection for eyes, face, hands, and clothing. Examples are safety goggles or face shield, a rubber apron and gloves.
- If battery acid enters your eye, immediately flush your eye with running cold water for at least 15 minutes. Get medical attention immediately.
- If battery acid contacts skin or clothing, wash immediately with soap and water.



ALERT! Performing maintenance and/or troubleshooting procedures may interrupt power to the loads, if battery reserve is not sufficient.

Personal Protective Equipment (PPE)



DANGER! ARC FLASH AND SHOCK HAZARD.

Appropriate PPE and tools required when working on this equipment. An appropriate flash protection boundary analysis should be done determine the “hazard/risk” category, and to select proper PPE. Notice that PPE is applicable for both AC and DC voltages.



This product is intended only for installation in a restricted access location.

Only authorized and properly trained personnel should be allowed to install, inspect, operate, or maintain the rack/equipment.

Do not work on LIVE parts. If required to work or operate live parts, obtain appropriate Energized Work Permits as required by the local authority, per NFPA 70E “Standard for Electrical Safety in the Workplace” or applicable local codes.

Maintenance and Servicing Procedures

General



WARNING! All equipment maintenance and servicing procedures involve internal access and should be carried out only by trained personnel on a de-energized system. Extreme caution is required when performing maintenance and servicing procedures. Be constantly aware that this system contains high DC as well as AC voltages. Check for voltage with both AC and DC voltmeters prior to making contact.

Special safety precautions are required for procedures involving maintenance of this system and the batteries.

Observe all safety precautions in this manual and in the battery instruction manual before as well as during performance of all maintenance procedures. Observe all battery safety precautions before working on or near the batteries. Service personnel and test equipment should be standing on rubber mats. Service personnel should wear insulating shoes for isolation from direct contact with the floor (earth ground).

This equipment contains several circuits that are energized with dangerous voltage. Only test equipment designed for troubleshooting should be used. This is particularly true for oscilloscopes. Always check with an AC and DC voltmeter to ensure safety before making contact or using tools. Even when the power is turned OFF, dangerously high electric charges may exist within the system.

Never work alone, even if all power is removed from the equipment. A second person should be standing by to assist and summon help in case an accident should occur.

Dual Hazardous Input Power Sources



WARNING! The system may be powered from dual hazardous input power sources simultaneously: Commercial AC and Battery DC. Disconnect both sources of power before servicing.

Hazardous Voltage



DANGER! Hazard of electrical shock. More than one disconnect may be required to de-energize the system before servicing.

Handling Equipment Containing Static Sensitive Components



ALERT! Installation or removal of equipment containing static sensitive components requires careful handling. Before handling any equipment containing static sensitive components, read and follow the instructions contained on the Static Warning Page.

Static Warning



This equipment contains static sensitive components. The warnings listed below must be observed to prevent damage to these components. Disregarding any of these warnings may result in personal injury or damage to the equipment.

1. Strictly adhere to the procedures provided in this document.
2. Before touching any equipment containing static sensitive components, discharge all static electricity from yourself by wearing a wrist strap grounded through a one megohm resistor. Some wrist straps, such as Emerson Network Power Part Number 631810600, have a built-in one megohm resistor; no external resistor is necessary. Read and follow wrist strap manufacturer's instructions outlining use of a specific wrist strap.
3. Do not touch traces or components on equipment containing static sensitive components.
Handle equipment containing static sensitive components only by the edges that do not have connector pads.
4. After removing equipment containing static sensitive components, place the equipment only on conductive or anti-static material such as conductive foam, conductive plastic, or aluminum foil. Do not use ordinary Styrofoam™ or ordinary plastic.
5. Store and ship equipment containing static sensitive components only in static shielding containers.
6. If necessary to repair equipment containing static sensitive components, wear an appropriately grounded wrist strap, work on a conductive surface, use a grounded soldering iron, and use grounded test equipment.

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General Information and Installation Checklist

Customer Documentation Package

This document (IM584001200) provides *Installation Instructions* for NetSure™ 9500 120kW 400V DC Power System Model 9500, Spec. No. 584001200.

The complete Customer Documentation Package consists of...

NetSure™ 9500 120kW 400V DC Power System Installation Manual

- Power System Installation Instructions: IM584001200

NetSure™ 9500 120kW 400V DC Power System Operation Manual

- Power System Operation Instructions: UM584001200
- Rectifier Instructions: UM1R40015000e
- Power System “System Application Guide”:
SAG584001200

NetSure™ 9500 400V DC Battery Cabinet Installation and Operation Manual

- Battery Cabinet Installation and Operation Instructions:
IM58400120090

NetSure™ ACU+ Controller User Manual

- ACU+ Controller User Instructions: UM1M820NNB-2

USB Drive with All Customer Documentation

- Power System Installation Instructions: IM584001200
- Power System Operation Instructions: UM584001200
- Battery Cabinet Installation and Operation Instructions:
IM58400120090
- Rectifier Instructions: UM1R40015000e
- Power System “System Application Guide”:
SAG584001200
- ACU+ Controller User Instructions: UM1M820NNB-2
- Engineering Drawings
- Also provided on the USB drive is an ACU+ configuration drawing and the ACU+ configuration files loaded into the ACU+ as shipped.

Recommended Tools and Test Equipment

The following tools and test equipment are recommended to install the DC Power System.

Contact Emerson for a full turn key installation quote.

- Non-Contact Voltage Detector
- Digital Multimeter (DMM), Capable of Measuring System AC Input and DC Output Voltages, 600V AC/DC Rated
- NO-OX-ID-A or Approved Equivalent
- Lineman's Scissors
- Lineman's Strippers
- Lineman's Cutters
- Electrician's Insulated Screwdrivers, Phillips, No. 1 and 2
- Electrician's Insulated Screwdrivers, Flat-Blade, Small and Large
- Insulated Nut Driver Set
- Hexagonal Bit Set
- Ratchet, 1/2" (13mm) Drive
- 10mm Socket, 13mm Socket, 14mm Socket or 14mm Wrench
- Adjustable Torque Wrench, 1/2" (13mm) Drive, 0 in.-lb. (0 Nm) to 125 in.-lb. (14 Nm)
- Lug Compression Crimp Tool, for Field Provided Battery Power Cable Terminations (as required)
- Pallet Jack or Forklift, Required to Move the Power Module/Bay (367 Kg / 810 lbs.), Distribution Module/Bay (204 Kg / 450 lbs.), and Battery Cabinet (1500 Kg / 3300 lbs.) in Place
- Tools Required for Rack/Cabinet Floor Fastening Hardware

Installation Acceptance Checklist

Provided in this section is an Installation Acceptance Checklist. This checklist helps ensure proper installation and initial operation of the system. As the procedures presented in this document are completed, check the appropriate box in this list. If the procedure is not required to be performed for your installation site, also check the box in this list to indicate that the procedure was read. When installation is done, ensure that each block in this list has been checked. Some of these procedures may have been factory performed for you.

Note: The system is not powered up until the end of the Installation Acceptance Checklist.

Note: Some of these procedures may have been performed at the factory for you.

Installing the System

- ☐ Equipment Inspection Completed
- ☐ Rack(s) / Cabinet(s) Secured to Floor

Making Electrical Connections

POWER MODULE/BAY (584001200 LIST 01)

- ☐ Rack Frame Grounding/Earthing Connection Made
- ☐ HRMG Connection Made
- ☐ AC Input Power and AC Input Equipment Grounding/Earthing Connections Made
- ☐ DC Load Distribution Connections Made (if DC distribution panel installed)
- ☐ IB2 (ACU+ Controller Interface Board) Connections Made (if required)
- ☐ Temperature Probe Connections Made (if required)
- ☐ ACU+ Controller Ethernet Connection Made
- ☐ External EPO (Emergency Power Off) Connections Made (if required)
- ☐ Battery Breaker Alarm/Shunt Trip Connections Made (if required)
- ☐ Battery Connections Made (if required)

DISTRIBUTION MODULE/BAY (584001200 LIST 07)

- ☐ Rack Frame Grounding/Earthing Connection Made
- ☐ DC Load Distribution Connections Made
- ☐ DC Distribution Panels Interconnected (if required)
- ☐ DC Input Connections Made

BATTERY CABINET (584001200 LIST 90, 91, 92, 93)

- ☐ Battery Cabinet Frame Grounding/Earthing Connection Made
- ☐ 48V Battery Breaker Shunt Trip Connection Made
- ☐ Battery Breaker Alarm Connections Made
- ☐ Battery Connections to the Power Module/Bay Made (positive and negative leads)

Installing the Rectifiers

- ☐ Rectifiers Installed

System Startup

- ☐ System Started, Configured, and Checked

Installing the System

General Requirements

- This product is intended only for installation in a restricted access location on or above a non-combustible surface.
- The installer should be familiar with the installation requirements and techniques to be used in securing the rack(s) cabinet(s) to the floor.
- Temperature of air entering the system must not exceed rated operating ambient temperature range found in SAG584001200.
- Front and rear access is required for installation.

Inspecting the Equipment and Storing for Delayed Installations

Inspecting the Equipment

Compare the contents of the shipment with the bill of lading. Report any missing items to the carrier and your local Emerson representative immediately.

While the system is still on the truck, inspect the equipment and shipping container(s) for any signs of damage or mishandling.

As the equipment is moved off the truck and unpacked, visually examine the system for transit damage.

Do not attempt to install the system if damage is apparent.

If any damage is noted, file a damage claim with the shipping agency within 24 hours and contact Emerson Network Power (see “NetPerform™ Optimization Services (North America)” on page24 or “NetPerform™ Optimization Services (EMEA)” on page25 for contact information) to inform them of the damage claim and the condition of the equipment.

Storing for Delayed Installation

If the equipment will not be installed immediately, it must be stored indoors where the humidity is no higher than 95%, non-condensing. The storage area must protect the system from excessive moisture.

Note: For optimal battery life, store Battery Cabinet at a temperature between -4°F to +77°F (-20°C to +25°C).

Positioning and Securing the Power Module/Bay (584001200 List 01) and Distribution Module/Bay (584001200 List 07) to the Floor

Position and secure the Power Module/Bay and/or Distribution Module/Bay to the floor per site requirements. Refer also to “General Requirements” on page 2.

The Power Module/Bay and Distribution Module/Bay consists of rack P/N 557861 (standard) or P/N 557858 (Seismic). Refer to the following procedures.

STANDARD RACK (P/N 557861) INSTALLATION PROCEDURE

1. Use at least two people when moving the rack.
2. Using a pallet jack or forklift, move the rack on its pallet to the installation location.
3. Cut the shrink wrap and remove all packaging.
4. Use a 14mm socket or a 14mm wrench to remove the lag bolts securing each shipping bracket to the shipping pallet. There are two brackets, one in the front and one at the rear of the rack. Each bracket is secured by four bolts (see Figure 1).

Note: Shipping brackets can also be used as an anchor bracket once unit is at final resting place. Leave the shipping brackets attached if they will be used to secure the rack to the floor.

5. Use a pallet jack or forklift to raise the rack off the shipping pallet.
6. Slide the shipping pallet out from under the rack.
7. The rack may be positioned for installation either with the pallet jack or forklift or by rolling the rack on its casters. If the casters are to be used to move the rack, the leveling feet must be raised. Position the rack and either lower the leveling feet or bolt the rack to the floor with the shipping/anchoring brackets.

SEISMIC RACK (P/N 557858) INSTALLATION PROCEDURE

1. Use at least two people when moving the rack.
2. Refer to Figure 2 and prepare the floor for the anchors being used to secure the rack.
3. Using a pallet jack or forklift, move the rack on its pallet to the installation location.
4. Cut the shrink wrap and remove all packaging.
5. Remove the bolts securing the rack to the shipping pallet.

6. Use a pallet jack or forklift to raise the rack off the shipping pallet.
7. Slide the shipping pallet out from under the rack.
8. Position the rack for installation with the pallet jack or forklift.
9. Bolt the rack to the floor per site requirements.

Figure 1. Removing Rack P/N 557861 from Shipping Pallet

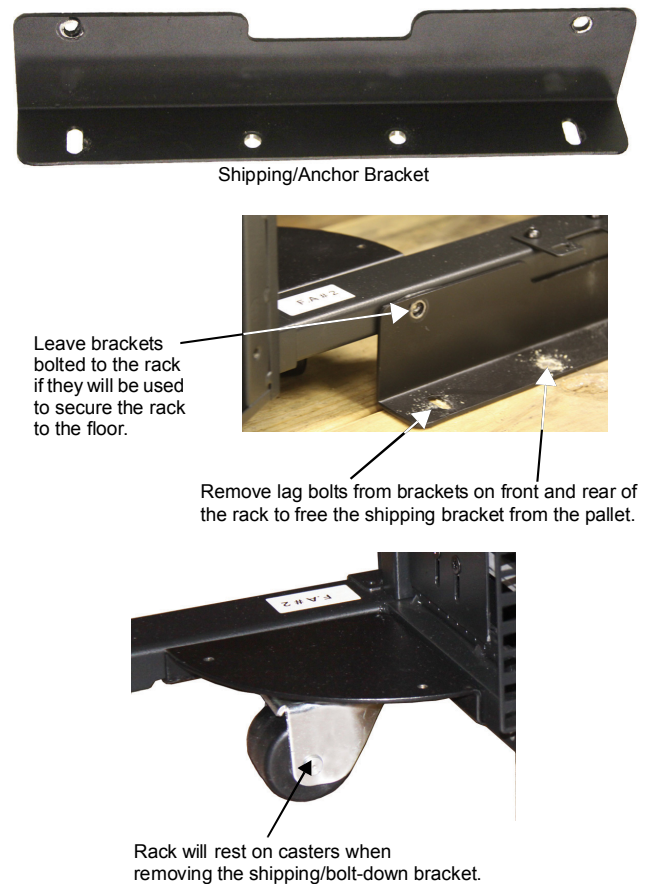
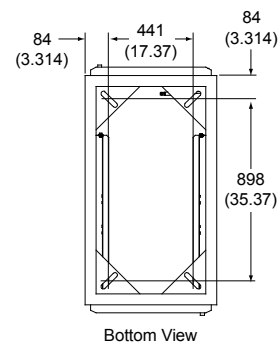


Figure 2. Rack P/N 557858 Floor Hole Drilling Pattern



Notes:
1. Dimensions are in mm (inches).

Positioning and Securing the Battery Cabinet (584001200 List 90, 91, 92, 93) to the Floor

Position and secure the Battery Cabinet to the floor per site requirements. Refer also to “General Requirements” on page 2.

The Battery Cabinet is furnished with separate installation and operation instructions. Refer to these instructions (IM58400120090) to position and secure the Battery Cabinet to the floor.

A pallet jack or forklift is required to install the Battery Cabinet (3500 lb capacity; batteries shipped installed in the cabinet).

Making Electrical Connections

Important Safety Instructions



Danger! Adhere to the “Important Safety Instructions” presented at the front of this document.

Wiring Considerations

All AC input and 400V DC output wiring, branch circuit protection, and grounding/earthing should follow the current edition of the American National Standards Institute (ANSI) approved National Fire Protection Association's (NFPA) National Electrical Code (NEC), and applicable local codes. For operation in countries where the NEC is not recognized, follow applicable codes.

For wire size, branch circuit protection, crimp lug, and general wiring recommendations; refer to System Application Guide SAG584001200 and the Battery Cabinet manual (IM58400120090).

General Grounding/Earthing Guidelines



Danger! Failure to follow proper grounding/earthing procedures can result in electric shock hazard to personnel and the risk of fire, should a ground fault occur.

For grounding/earthing requirements, refer to the current edition of the American National Standards Institute (ANSI) approved National Fire Protection Association's (NFPA) National Electrical Code (NEC), applicable local codes, and your specific site requirements. For operation in countries where the NEC is not recognized, follow applicable codes.

Refer also to the grounding/earthing procedures in this document.

Output Ground Configuration

This system is configured for High Resistance Midpoint Ground (HRMG). Ensure the HRMG lead is properly connected to ground/earth per the instructions that follow.

Cable Routing

The Power Module/Bay and Distribution Module/Bay are provided with top plates that have cable routing holes that either accept conduit fittings or corded connections.

Torque

Torque all connections as specified in the illustrations presented in this section.

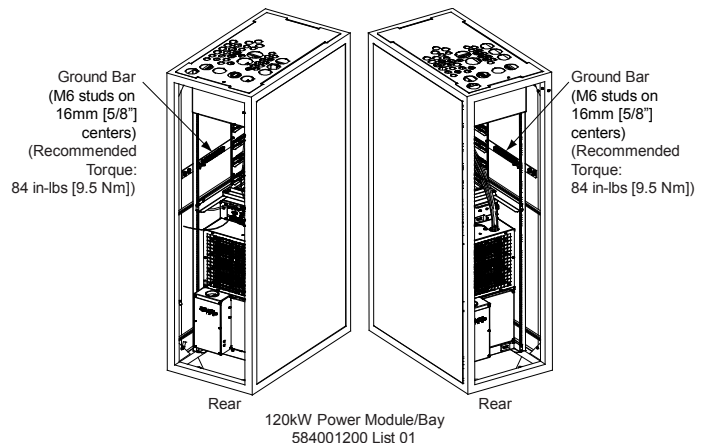
Electrical Connections to Power Module/Bay (584001200 List 01)

Power Module/Bay Rack Frame Grounding/Earthing Connection

Refer also to “General Grounding/Earthing Guidelines” on page 4.

Supply a grounding/earthing lead from site ground/earth to the rack ground bar. Refer to [Figure 3](#) for connection point.

Figure 3. Power Module/Bay Rack Frame Grounding/Earthing



Power Module/Bay HRMG Connection

Refer also to “General Grounding/Earthing Guidelines” on page 4.

A ground lead exits the rear of the power and control section in the Power Module/Bay. This lead **MUST** be connected to ground/earth for proper operation of the HRMG circuit and the ground fault detection circuit. Refer to [Figure 4](#) for location. **THIS LEAD IS FACTORY CONNECTED TO THE RACK'S GROUND BAR.**



Caution! Failure to terminate this conductor to ground/earth will render the system ground fault detection circuit and the $\pm 200\text{V}$ DC voltage reference inoperable. It is essential to properly bond this lead to ground/earth.

Figure 4. Power Module/Bay HRMG Connection

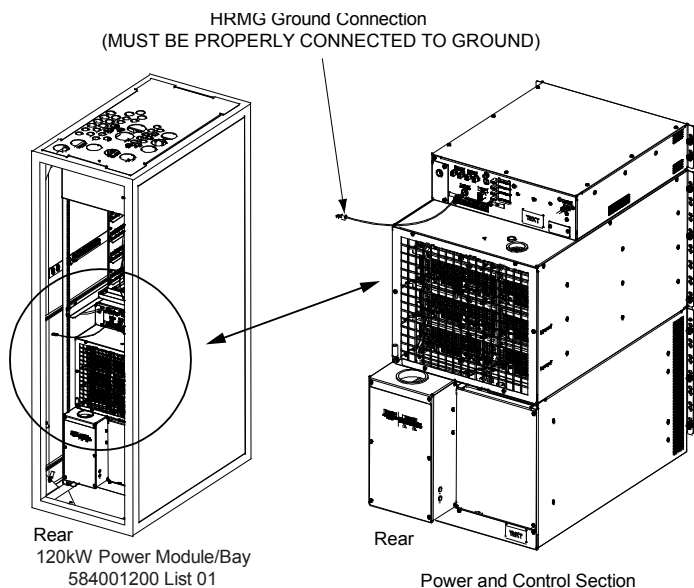
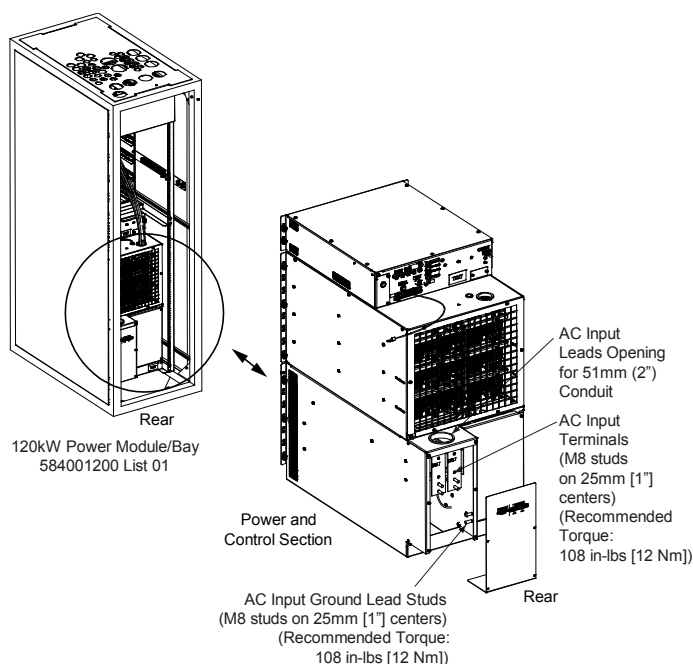


Figure 5. Power Module/Bay AC Input Power Connections



Power Module/Bay AC Input Power and AC Input Equipment Grounding/Earthing Connections



Danger! Adhere to the “Important Safety Instructions” presented at the front of this document. DO NOT attempt to work on an energized system.

AC input connections are made to AC input terminals located behind an access panel located on the rear of the power and control section. Studs are also provided for the AC input ground/earth lead. Refer to Figure 5 for location and connection details.

Power Module/Bay DC Load Distribution Connections (if DC distribution panel installed)



Danger! Adhere to the “Important Safety Instructions” presented at the front of this document. DO NOT attempt to work on an energized system.



Warning! Check for correct polarity before making connections.

Load distribution leads are connected to the load distribution panel(s) as shown in Figure 6 and Figure 7.

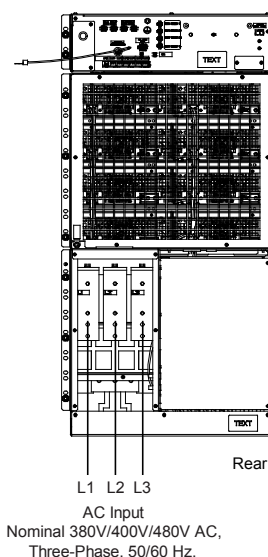
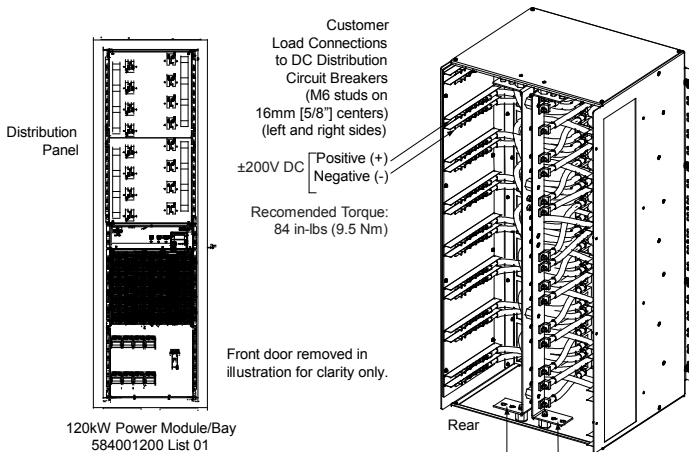


Figure 6. Power Module/Bay DC Load Distribution Connections to Distribution Panel List 21HA



these connections is 2.2 in-lbs (0.25 Nm). Refer to [Figure 8](#) for terminal locations. Refer to [Table 1](#) and [Table 2](#) for pin-out information.

- **Digital Inputs**

Connect up to eight (8) digital inputs to the IB2. Note that you must supply both paths for the digital input (either a positive or negative signal and the opposite polarity return path). Observe proper polarity. Refer to [Figure 8](#) for terminal locations and [Table 1](#) for pin-out information.

Note: +48V is available on terminal J5-5 and Return (RTN) is available on terminal J5-6 for customer connection to digital inputs.

The digital inputs can be programmed to provide an alarm when the signal is applied (HIGH) or removed (LOW). Refer to the ACU+ Controller Operation Instructions (UM1M820NNB-2) for programming information.

Digital Input Ratings: Refer to the following.

- Maximum Voltage Rating: 60V DC.
- Active High: > 19V DC.
- Active Low: < 1V DC.

- **Programmable Relay Outputs**

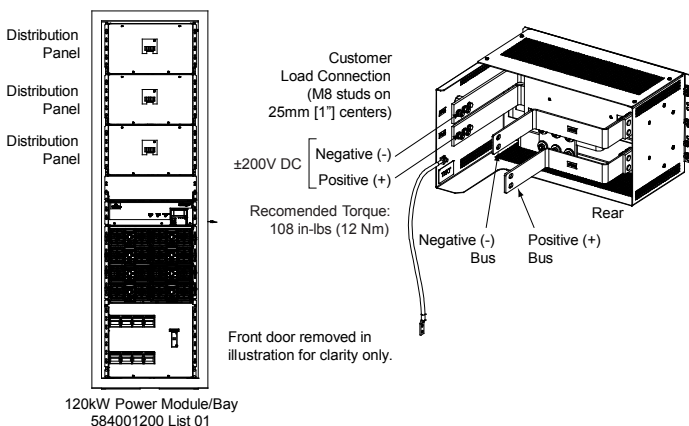
The IB2 provides eight (8) programmable alarm relays with dry Form-C contacts. Connect up to eight (8) relay outputs to the IB2. Refer to [Figure 8](#) for terminal locations and [Table 2](#) for pin-out information.

Refer to the ACU+ Controller Operation Instructions (UM1M820NNB-2) for programming information.

Relay Ratings: Refer to the following.

- 1A Steady State @ 30V DC.
- 3A Peak @ 30V DC.

Figure 7. Power Module/Bay DC Load Distribution Connections to Distribution Panel List 23HA



Power Module/Bay IB2 (ACU+ Controller Interface Board P/N MA4C5U31) Connections

The IB2 (ACU+ Controller Interface Board) provides connection points for digital inputs and programmable relay outputs. The IB2 interface board is accessed from the rear of the power and control section of the Power Module/Bay. Loosen the two captive fasteners and slide the tray the IB2 assembly is mounted to out far enough to make the electrical connections. Refer to [Figure 8](#). When connecting input and output wires to the IB2 board, route the leads through the opening provided in the tray the IB2 assembly is mounted to (see [Figure 8](#)).

DIGITAL INPUTS AND PROGRAMMABLE RELAY OUTPUTS

Digital input and relay output leads are connected to screw-type terminal blocks located on the IB2. Recommended torque for

Power Module/Bay Temperature Probe Connections

Note: Each temperature probe consists of two pieces that plug together to make a complete probe. See SAG584001200 for part numbers and descriptions.

Temperature probes are connected to connectors located on the rear of the power and control section of the Power Module/Bay. See [Figure 9](#).

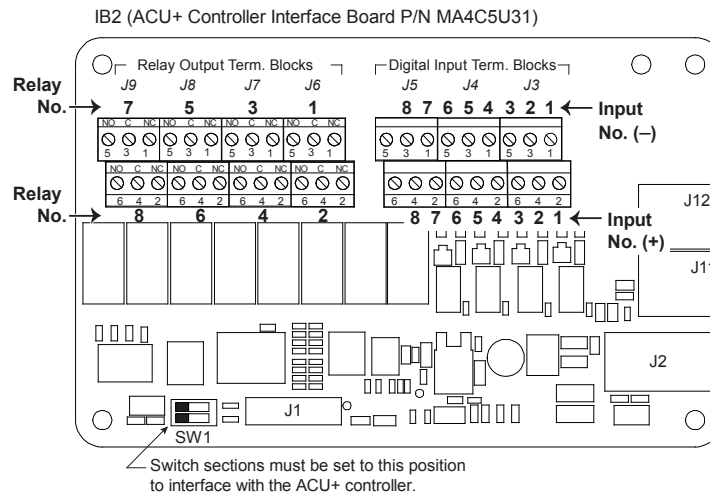
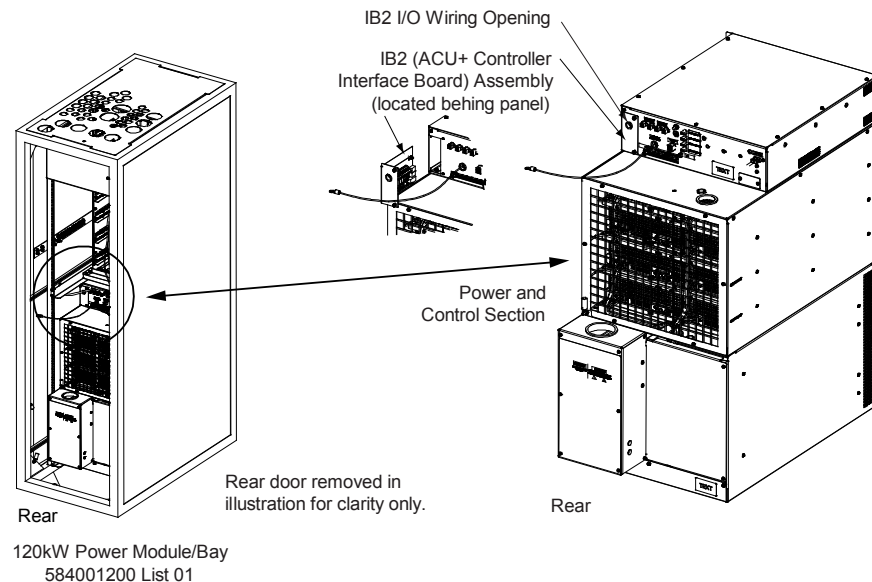
Up to six (6) temperature probes can be connected to the power and control section of the Power Module/Bay. Any combination of the six (6) temperature probes can be programmed to monitor

ambient air temperature and/or battery temperature. A temperature probe set to monitor battery temperature can also be used for the rectifier battery charge temperature compensation feature. The battery charge temperature compensation feature allows the controller to automatically increase or decrease the output voltage of the system to maintain battery float current as battery temperature decreases or increases, respectively. Battery life can be extended when an optimum charge voltage to the battery with respect to temperature is maintained. A temperature probe set to monitor battery temperature can also be used for the BTRM (Battery Thermal Runaway Management) feature. The BTRM feature lowers output voltage when a high temperature condition exist to control against battery thermal runaway.

A temperature probe programmed to monitor battery temperature, battery charge temperature compensation, and/or BTRM (Battery Thermal Runaway Management) should be mounted to the center of the battery cell closest to the center of the cabinet to sense battery temperature. A temperature probe programmed to monitor ambient temperature should be mounted in a convenient location, away from direct sources of heat or cold. To mount a temperature probe, peel the backing from the self-adhesive surface and affix the probe to a clean and dry surface.

Refer to the ACU+ Controller Operation Instructions (UM1M820NNB-2) for programming information.

Figure 8. Power Module/Bay IB2 (ACU+ Controller Interface Board) Connections



J3-J9:
Wire Size Capacity: 16-26 AWG (1.5-0.5mm²).
Recommended Torque: 2.2 in-lbs (0.25 Nm).

Table 1. Programmable Digital Inputs – IB2

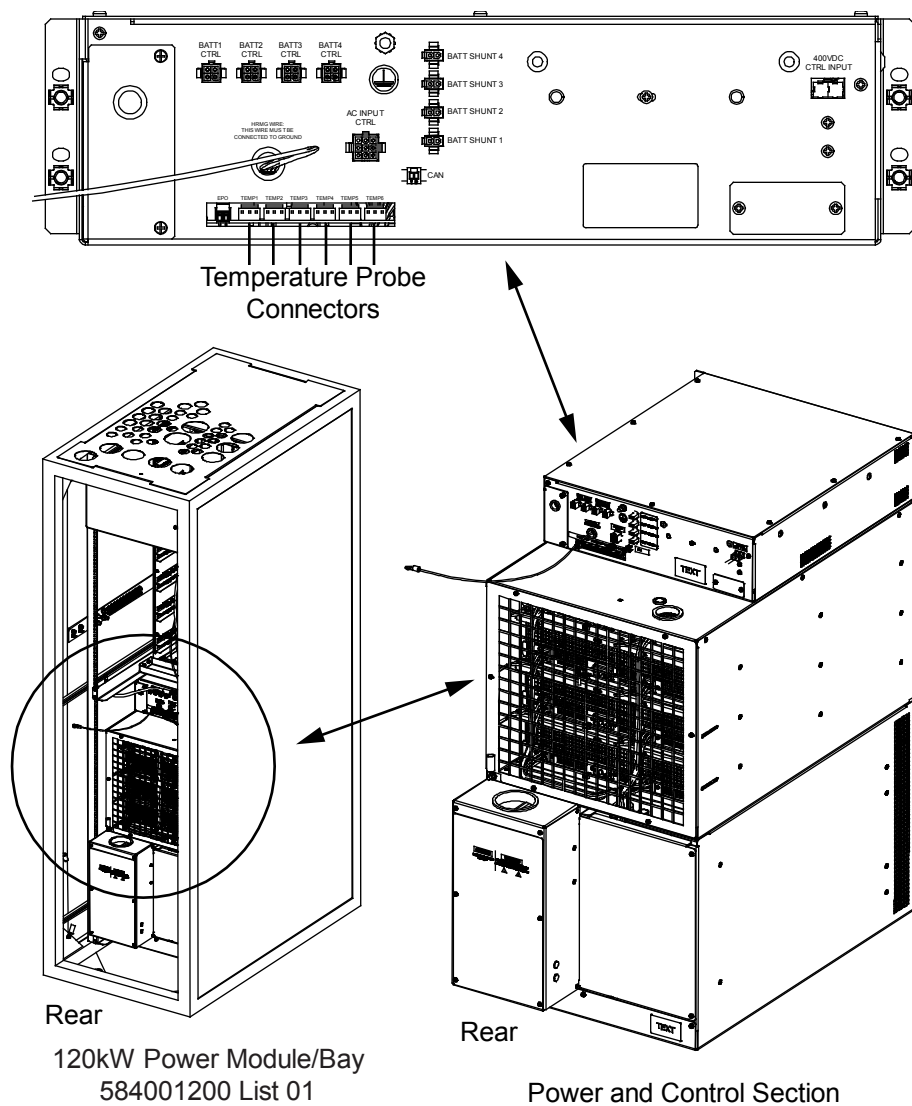
Programmable Digital Input	IB2 Pin No.		Default Digital Input Function	Customer Defined Digital Input Function
1	J3-2	+	none	
	J3-1	–		
2	J3-4	+	none	
	J3-3	–		
3	J3-6	+	none	
	J3-5	–		
4	J4-2	+	none	
	J4-1	–		
5	J4-4	+	none	
	J4-3	–		
6	J4-6	+	none	
	J4-5	–		
7	J5-2	+	none	
	J5-1	–		
8	J5-4	+	none	
	J5-3	–		
--	J5-5		+48V *	--
--	J5-6		RTN *	--

* +48V is available on terminal J5-5 and Return (RTN) is available on terminal J5-6 for customer connection to digital inputs.

Table 2. Programmable Relay Outputs – IB2

Programmable Relay Output		IB2 Pin No.	Alarms Assigned to this Relay (Default)	Alarms Assigned to this Relay (Custom)
1	NO	J6-5	Factory Connected (factory use only)	Not Available
	COM	J6-3		
	NC	J6-1		
2	NO	J6-6	none	
	COM	J6-4		
	NC	J6-2		
3	NO	J7-5	none	
	COM	J7-3		
	NC	J7-1		
4	NO	J7-6	none	
	COM	J7-4		
	NC	J7-2		
5	NO	J8-5	none	
	COM	J8-3		
	NC	J8-1		
6	NO	J8-6	none	
	COM	J8-4		
	NC	J8-2		
7	NO	J9-5	none	
	COM	J9-3		
	NC	J9-1		
8	NO	J9-6	none	
	COM	J9-4		
	NC	J9-2		

Figure 9. Power Module/Bay Temperature Probe Connections



ACU+ Controller Ethernet Connection

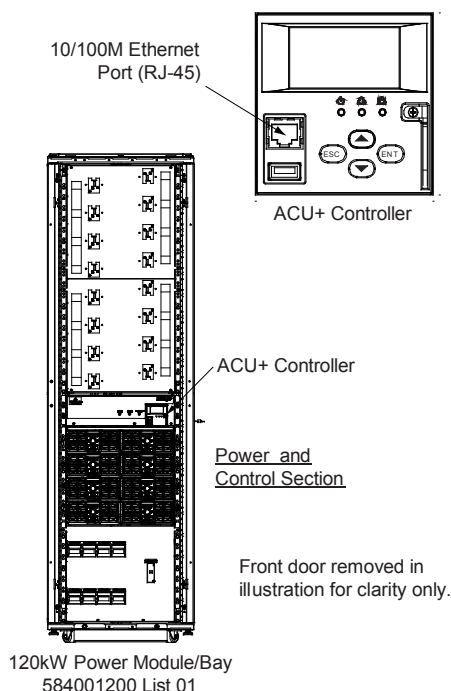
The ACU+ controller provides a Web interface via an Ethernet connection. This interface can be accessed locally on a computer or remotely through a network. An RJ-45 10BaseT jack is provided on the front of the ACU+ controller for connection to a computer or into a customer's network. This jack has a standard Ethernet pin configuration scheme, twisted pair. Refer to [Figure 10](#) for location. Use shielded Ethernet cable (grounded at both ends). Note that the ACU+ RJ-45 jack is connected to chassis ground. Refer to the ACU+ Controller Operation Instructions (UM1M820NNB-2) for operational details.



Warning! The intra-building port(s) of the equipment or subassembly is suitable for connection to intra-building or unexposed wiring or cabling only. The intra-building port(s) of the equipment or subassembly **MUST NOT** be metallically connected to the interfaces that connect to the OSP or its wiring. These interfaces are designed for use as intra-building interfaces only (Type 2 or Type 4 ports as described in GR-1089-CORE, Issue 4) and require isolation from the exposed OSP cabling. The addition of Primary Protectors is not sufficient protection in order to connect these interfaces metallically to OSP wiring.

The intra-building port (RJ-45) of the equipment or subassembly must use shielded intra-building cabling/wiring that is grounded at both ends.

Figure 10. ACU+ Ethernet Port



Power Module/Bay External EPO (Emergency Power Off) Connections

The Power Module/Bay has an Emergency Power Off (EPO) function operated by a remote contact provided by the User.

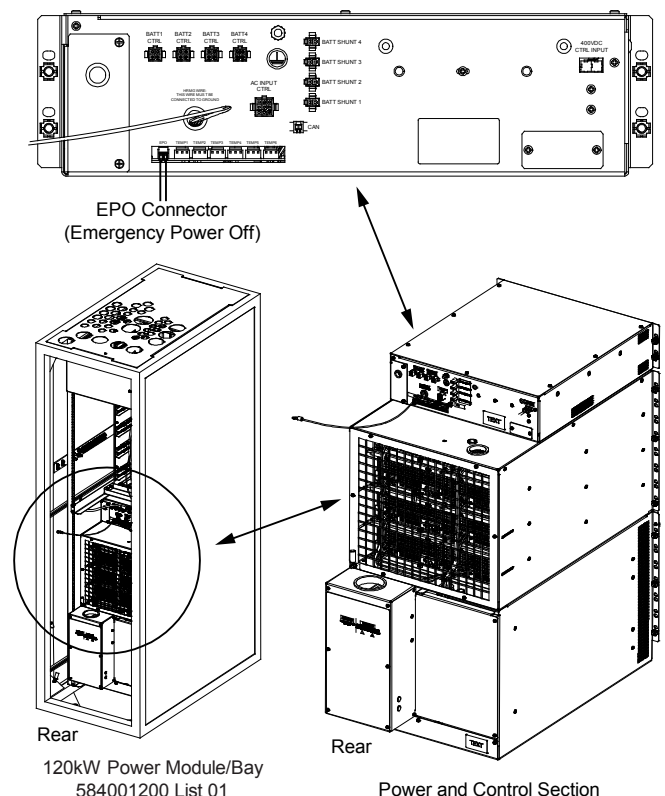
Note: The external EPO switch wiring must be double-insulated. The wire must be 600V, 18-16 AWG stranded for maximum runs between 82 and 197 feet (25-60m).

When the EPO switch is momentarily closed, the main AC input circuit breaker located on the power and control section of the Power Module/Bay and the battery disconnect circuit breakers (if connected to the BATT1 CTRL, BATT2 CTRL, BATT3 CTRL, and/or BATT4 CTRL connectors located on the rear of the power and control section of the Power Module/Bay) are tripped open to isolate the system from all electrical sources. Manual intervention is required to restart the system. Restart the system by first turning ON the main AC input circuit breaker then the battery circuit breaker(s).

PROCEDURE

1. Connect a customer provided external normally open switch between the EPO terminals provided on the rear of the power and control section of the Power Module/Bay. Refer to [Figure 11](#) for location.

Figure 11. Power Module/Bay EPO (Emergency Power Off) Terminals



Power Module/Bay Battery Breaker Alarm/Shunt Trip Connections

For Emerson provided Battery Cabinet, a battery breaker alarm/shunt trip cable (P/N 557867) is provided with the system. This cable connects between the power and control section of the Power Module/Bay (see [Figure 12](#)) and the Battery Cabinet (see Battery Cabinet instructions IM58400120090).

Customer battery solutions must utilize a compatible battery breaker. Also one (1) Battery Breaker Alarm/Shunt Trip cable (P/N 557867) must be ordered for each battery string. Battery breaker requirements are as follows.

- Battery breaker must contain a 48V shunt trip with the following specifications.
 - a. Rated Voltage: 48 to 60 VDC.
 - b. Maximum Release Duration: 15ms.
 - c. Minimum Resistance: >15 ohm.
- Battery breaker must contain auxiliary contacts that are normally closed if the breaker is closed. Minimum contact rating is 48V DC at 2A.
- It is recommended that the battery breaker have a lock-out/tag-out feature to allow for maintenance safety.

Power Module/Bay Battery Shunt Connections

The battery shunt connectors on the power and control section of the Power Module/Bay are factory connected to the battery shunts also located in the Power Module/Bay. See [Figure 12](#).

Power Module/Bay Battery Connections



Danger! Adhere to the “Important Safety Instructions” presented at the front of this document. DO NOT attempt to work on an energized system.



Warning! Observe proper polarity when making battery connections.

Note: The maximum short circuit capacity of the circuit breakers in the system is 25kAIC. Therefore, the maximum number of Emerson provided Battery Cabinets is limited to a maximum of three (3). The use of a fourth Battery Cabinet will exceed the short circuit rating of the circuit breakers in the system.

Note: The short circuit current generated by a customer provided battery option cannot exceed 25kAIC.

Up to four battery strings can be connected to the battery terminals located in the Power Module/Bay. Connect the battery strings to the positive and negative battery connection points per [Figure 13](#). Refer to SAG584001200 for wire size and crimp lug information. See separate Battery Cabinet instructions (IM58400120090) for connection points in the Battery Cabinet.

Figure 12. Power Module/Bay Battery Breaker Alarm/Shunt Trip and Battery Shunt Connections

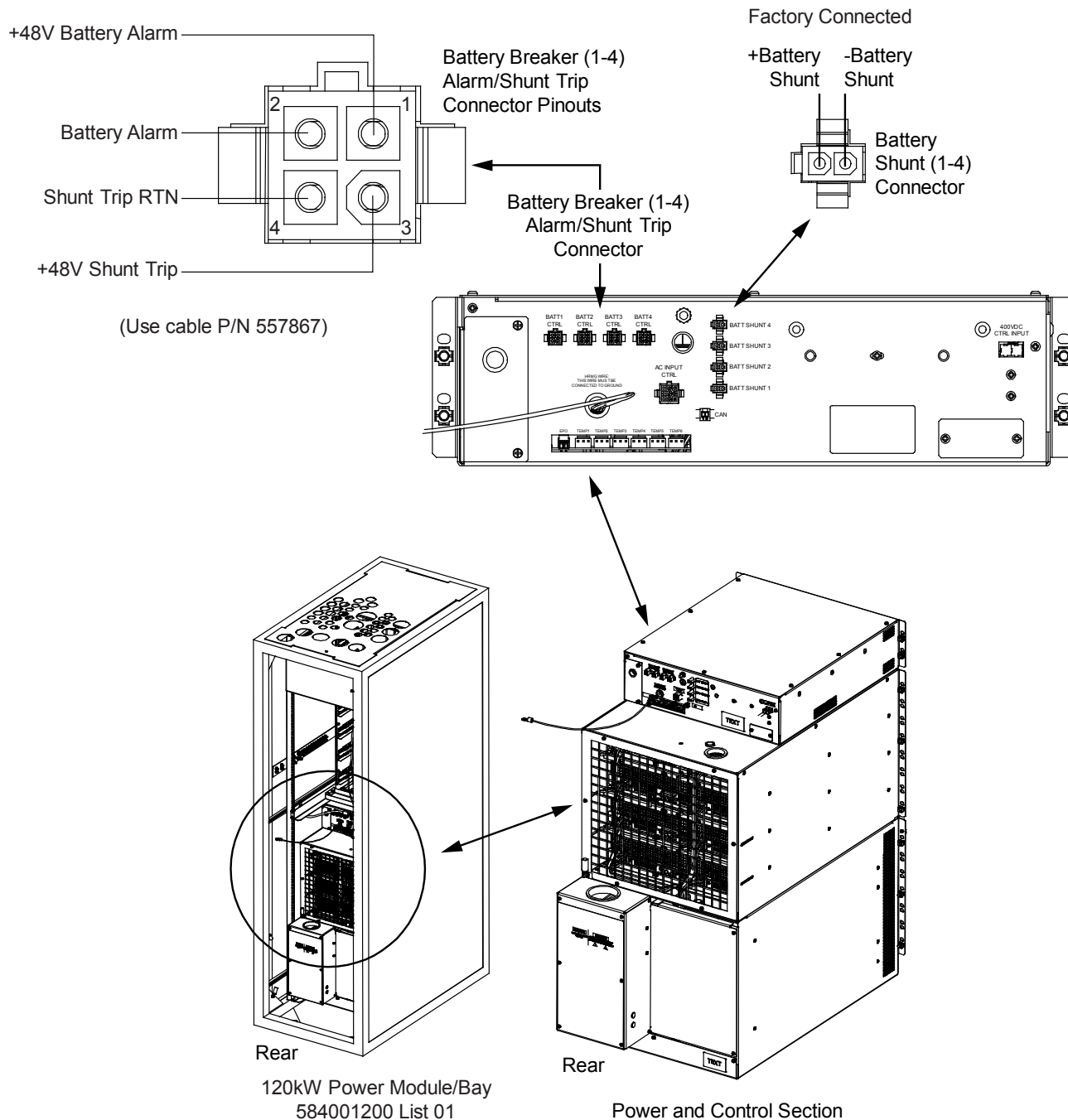
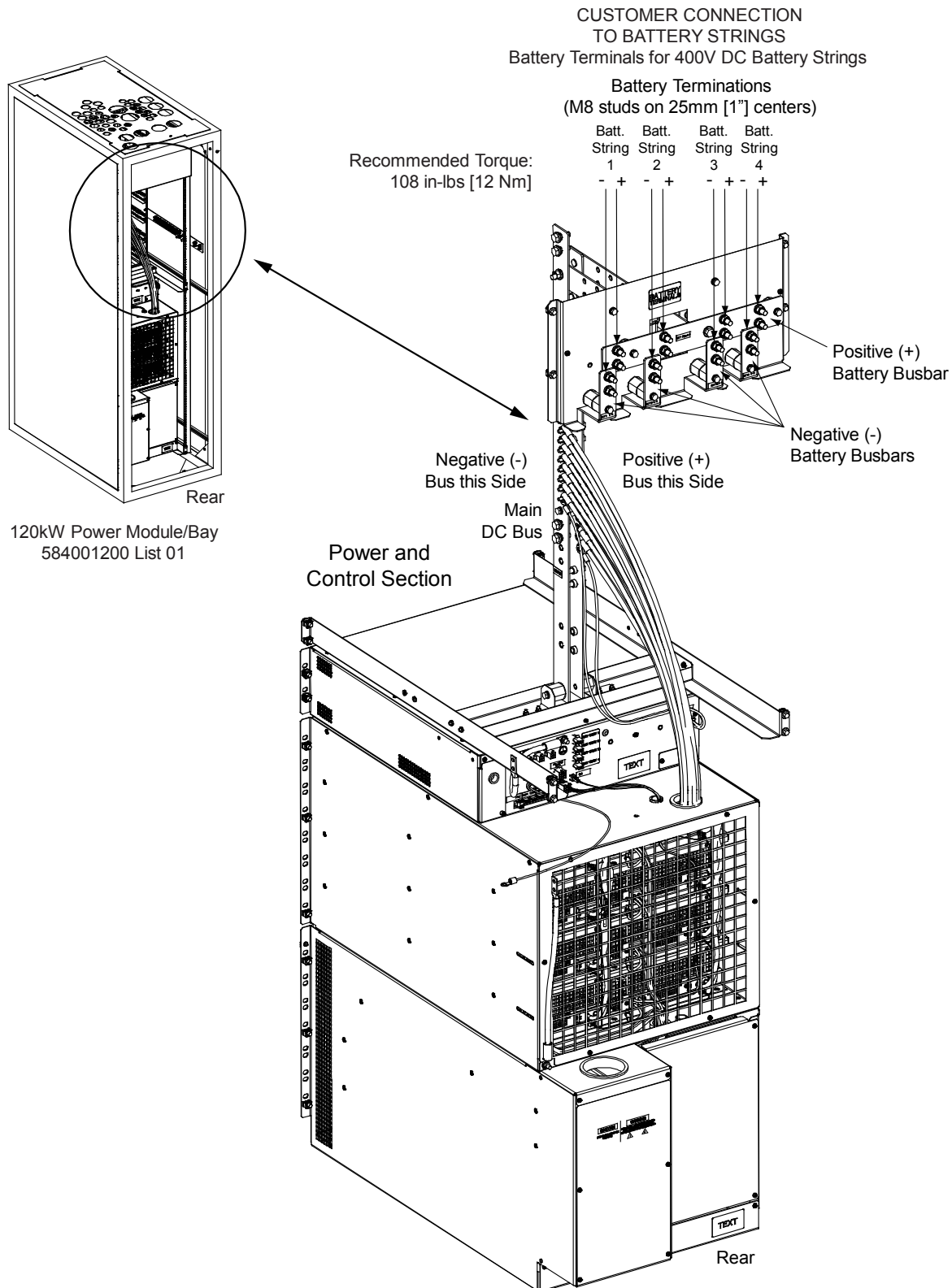


Figure 13. Power Module/Bay Battery Connections



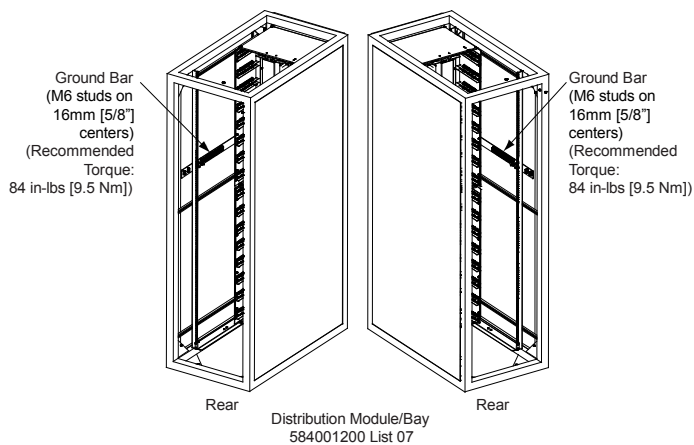
Electrical Connections to Distribution Module/Bay (584001200 List 07)

Distribution Module/Bay Rack Frame Grounding/Earthing Connection

Refer also to “General Grounding/Earthing Guidelines” on page 4.

Supply a grounding/earthing lead from site ground/earth to the rack ground bar. Refer to [Figure 14](#) for connection point.

Figure 14. Distribution Module/Bay Rack Frame Grounding/Earthing



Distribution Module/Bay Distribution Panel List 21HA Connections



Danger! Adhere to the “Important Safety Instructions” presented at the front of this document. DO NOT attempt to work on an energized system.



Warning! Check for correct polarity before making connections.

OUTPUT CONNECTIONS

Load distribution leads are connected to the load distribution panel(s) as shown in [Figure 15](#).

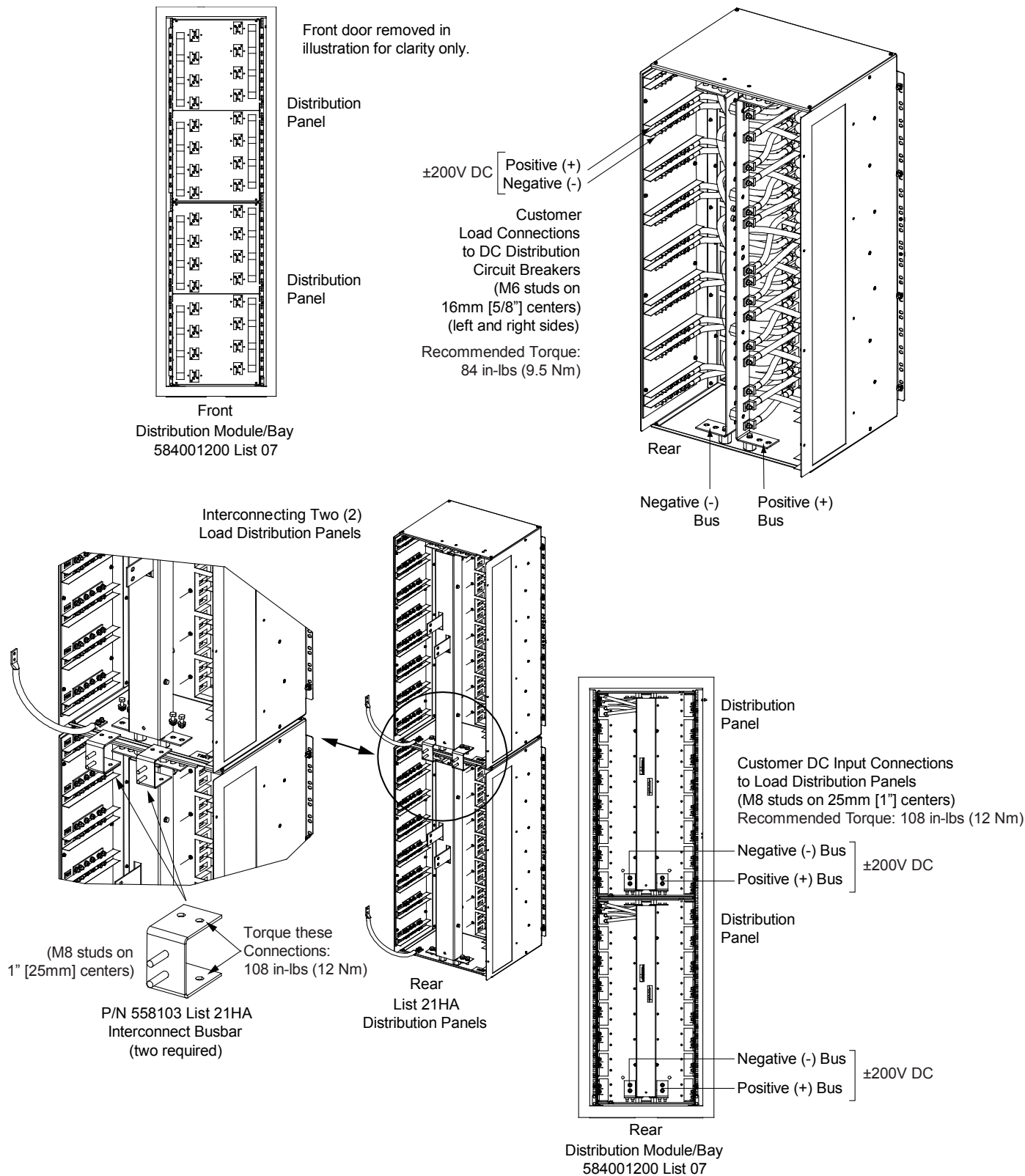
INTERCONNECTING DC DISTRIBUTION PANELS (IF REQUIRED)

DC distribution panels can be interconnected as shown in [Figure 15](#).

INPUT CONNECTIONS

DC distribution panel DC input leads are connected to the distribution panel(s) as shown in [Figure 15](#).

Figure 15. Distribution Module/Bay DC Load Connections, DC Input Connections, and Interconnecting Two (2) DC Load Distribution Panels



Electrical Connections to Battery Cabinet (584001200 List 90, 91, 92, 93)



Danger! Adhere to the “Important Safety Instructions” presented at the front of this document. DO NOT attempt to work on an energized system.



Warning! Check for correct polarity before making battery connections.

Note: The maximum short circuit capacity of the circuit breakers in the system is 25kAIC. Therefore, the maximum number of Emerson provided Battery Cabinets is limited to a maximum of three (3). The use of a fourth Battery Cabinet will exceed the short circuit rating of the circuit breakers in the system.

Batteries are factory installed and connected in the Battery Cabinet.

Note: Batteries are physically factory installed, but require one series strap connection to complete the string wiring. The batteries as shipped are connected with one wire disconnected in the middle of the string, for shipping safety.

The Battery Cabinet is furnished with separate installation instructions (IM58400120090). Refer to these instructions to make the follow connections to the Battery Cabinet.

- Battery Cabinet Frame Grounding/Earthing Connection (see also “General Grounding/Earthing Guidelines” on page 4)
- 48V Battery Breaker Shunt Trip Connection (see also “Power Module/Bay Battery Breaker Alarm/Shunt Trip Connections” on page 12)
- Battery Breaker Alarm Connections (see also “Power Module/Bay Battery Breaker Alarm/Shunt Trip Connections” on page 12)
- Battery Connections to the Power Module/Bay (see also “Power Module/Bay Battery Connections” on page 12)

Installing the Rectifier Module

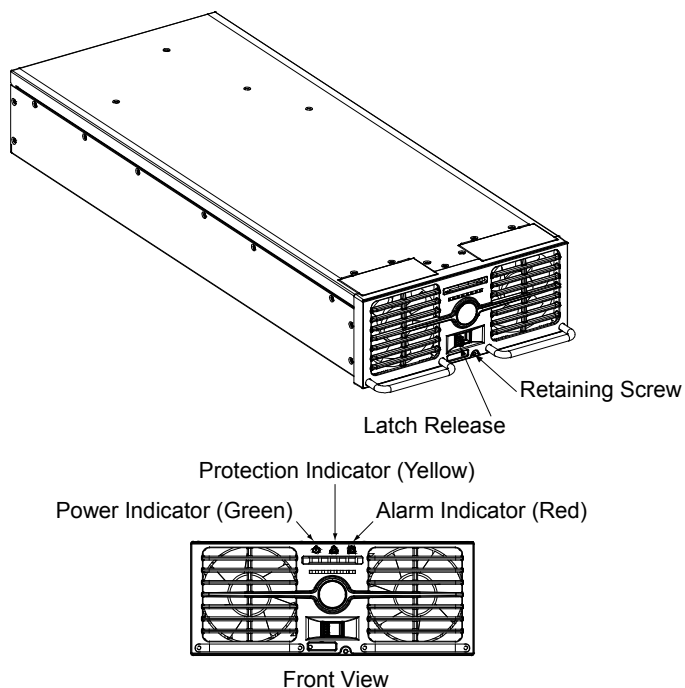
The rectifier module is hot swappable. It can be installed with the system operating if these instructions are carefully followed.

Note: There is a two-step insertion process.

PROCEDURE

1. Unpack the rectifier module.
2. If present, remove the blank cover panel from the rectifier module mounting position.
3. Open the respective rectifier module’s AC input circuit breaker on the front of the power and control section of the Power Module/Bay. Refer to [Figure 17](#) for circuit breaker location.
4. Place the “Latch Release” located on the front of the rectifier module to the LEFT position. See [Figure 16](#).
5. Place the rectifier module into an unoccupied mounting slot without sliding it in completely. Gently push the rectifier module into the mounting slot until it stops. Note that the rectifier module will NOT be completely seated in the mounting slot until the next step is performed.
6. Live Systems: Wait for the green power indicator to illuminate. Ensuring the green power indicator stays on, slide the “Latch Release” located on the front of the rectifier module to the RIGHT position. Gently push the rectifier module into the mounting slot until it is completely seated.
De-energized Systems: Slide the “Latch Release” located on the front of the rectifier module to the RIGHT position. Gently push the rectifier module into the mounting slot until it is completely seated.
7. Secure the rectifier module to the power and control section of the Power Module/Bay by tightening the retaining screw.
8. Repeat the above steps for each rectifier module being installed in the system.
9. After the rectifier modules are physically installed in their mounting slots, they are ready for operation immediately after power is supplied to them.
10. Close the respective rectifier module’s AC input circuit breaker on the front of the power and control section of the Power Module/Bay.

Figure 16. Installing a Rectifier Module into a Power Module/Bay



System Startup

Important Safety Instructions



Caution! Performing various steps in the following procedures may cause a service interruption and/or result in the extension of alarms. Notify any appropriate personnel before starting these procedures. Also, notify personnel when these procedures are completed.

Note: Contact Emerson Services for startup assistance.

Initial Preparation

Refer to Figure 17 for circuit breaker locations.

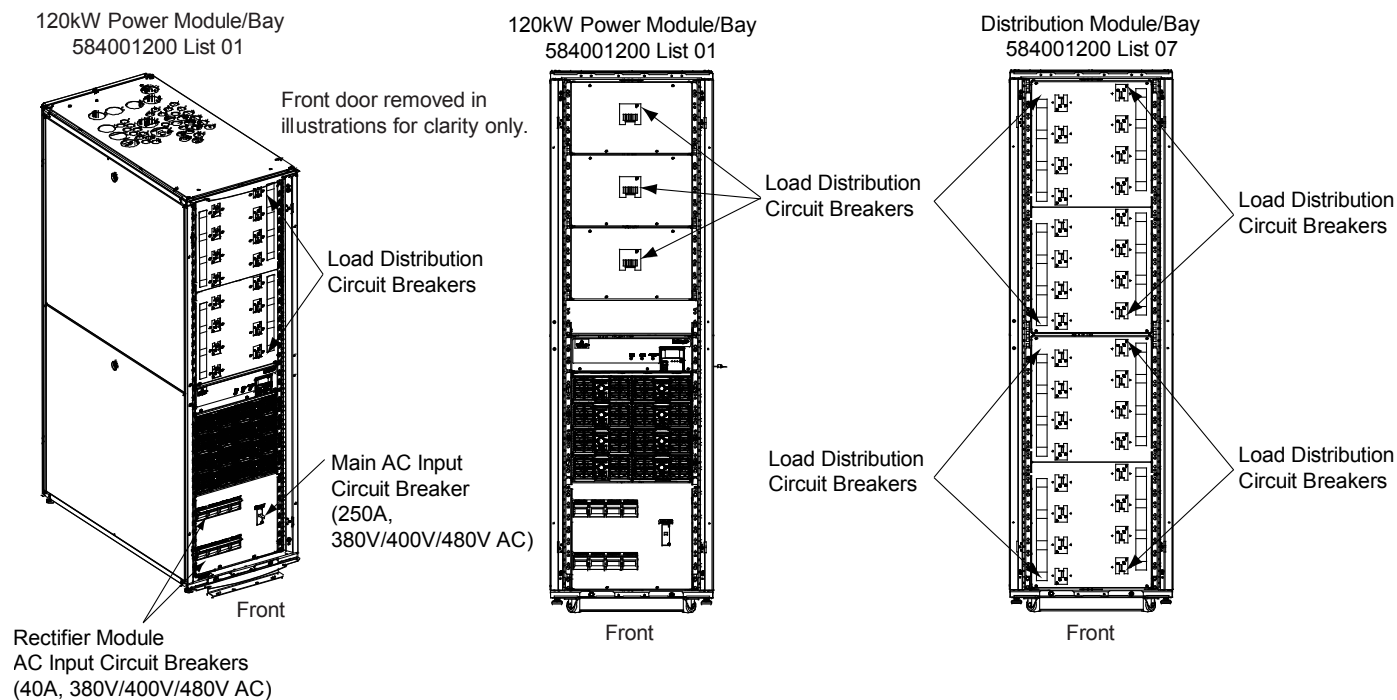
- Ensure that all blocks (except the last one) in the “Installation Acceptance Checklist” starting on page 1 have been checked.
- Ensure the main AC input circuit breaker located on the power and control section of the Power Module/Bay is in the OFF position.
- Ensure each rectifier module AC input circuit breaker located on the power and control section of the Power Module/Bay is in the OFF position.
- Ensure that a rectifier module or a blank cover panel is installed in all rectifier mounting positions.
- Ensure each load distribution circuit breaker in the Power Module/Bay (if distribution panel is installed) and Distribution Module/Bay(s) is in the OFF position.
- Ensure each battery string circuit breaker is in the OFF position.

Initially Starting the System

PROCEDURE

1. Close the external AC disconnect or protective device that supplies AC power to the system.
2. Place the main AC input circuit breaker located on the front of the power and control section of the Power Module/Bay to the ON position.
3. Place each rectifier module AC input circuit breaker located on the front of the power and control section of the Power Module/Bay to the ON position. Rectifiers automatically start.
4. Place each battery string circuit breaker to the ON position.
5. Place each load distribution circuit breaker in the Power Module/Bay (if distribution panel is installed) and Distribution Module/Bay(s) to the ON position.

Figure 17. Circuit Breaker Locations



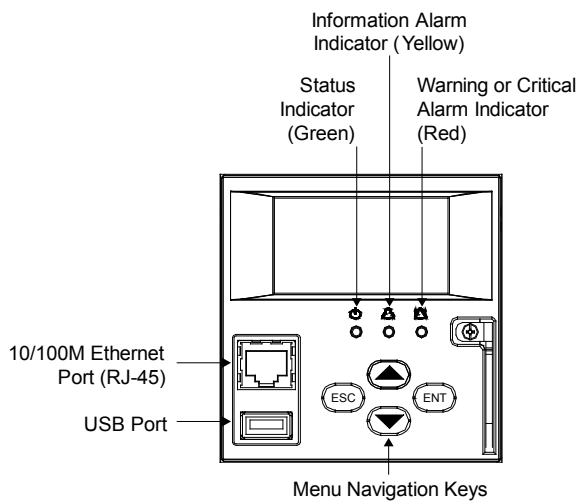
ACU+ Controller Initialization

Note: Your ACU+ controller was programmed with a configuration file that provides initial settings for all adjustable parameters. Provided on a USB drive furnished with the system is an ACU+ configuration drawing (C-drawing) and the ACU+ configuration files loaded into the ACU+ as shipped

Refer to the ACU+ Controller Operation Instructions (UM1M820NNB-2) for detailed instructions.

Refer to [Figure 18](#) for locations of the ACU+ local indicators and navigation keys.

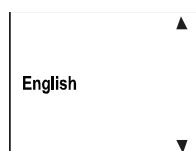
Figure 18. ACU+ Controller Local Indicators and Navigation Keys



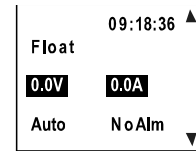
PROCEDURE

Note: The initialization routine takes several minutes. During that time various alarm indicators may illuminate on the ACU+ front panel and an audible alarm may sound. Disregard all alarms. An audible alarm can be silenced at any time by momentarily depressing the **ENT** key on the ACU+ Controller.

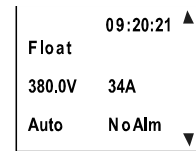
1. After the ACU+ is powered on, the display alternates between the “Emerson Network Power” screen and a screen displaying “Advanced Control Unit Plus Version ***** Starting...”.
2. Next, the language screen appears. Press the up or down arrow key to select the desired language. Press the **ENT** key to confirm the selection. If no key is pressed within 10 seconds, the ACU+ selects the displayed language automatically.



3. As initialization continues, the Main screen is displayed, but with zero volts. Initialization is not complete.



4. When initialization is complete, the Main screen displays voltage and current normally, and no alarms are active.



5. System information is displayed in multiple screens. Repetitively press the up or down arrow key to view other system information screens one by one.
6. From the Main screen, press **ENT** to go to the “Main Menu” screen.



7. From the Main Menu, select a sub-menu by repetitively pressing the up or down arrow key. The selected sub-menu will be indicated by the cursor. Press **ENT** to open the sub-menu.

Note: Repeatedly press the “ESC” key to return in reverse order level by level from any sub-menu until the Main screen appears.

8. Verify and set the ACU+ Controller as required for your application. Refer to the ACU+ Controller Operation Instructions (UM1M820NNB-2) for procedures. Note that you will have to program the ACU+ for any of the following.
 - a. Battery capacity if different then the factory default of 120 Ah per battery string for the Emerson provided Battery Cabinet.
 - b. Number of battery strings connected to the system. This is set in the Module 1 Distribution menu. Depending on the ACU+ configuration installed in your system (1 battery shunt or 4 battery shunts), the menu item displayed is “Battery Breaker 1 Installed” or “Battery String 1 Installed”. For a 1-shunt system, this sets the number of battery breakers being used in the system. For a 4-shunt

system, this sets the number of shunts being used in the system and the number of battery breakers being used in the system.

- c. Temperature probes connected to the temperature probe inputs located on the power and control section of the Power Module/Bay.
- d. External inputs/outputs connected to the IB2 (ACU+ Interface Board) located on the power and control section of the Power Module/Bay.

Verifying the Configuration File

Your ACU+ controller was programmed with a configuration file that provides initial settings for all adjustable parameters. The version number of the configuration file can be found on the configuration drawing (C-drawing) that is supplied with your power system documentation, and on a label located on the ACU+. You can verify that the correct configuration file has been loaded into your ACU+ by performing the following procedure.

PROCEDURE

Note: When viewing any of the following screens, if a key is not depressed within approximately 10 seconds, the ACU+ will automatically return to the Main screen.

1. With the Main screen displayed, press **ESC**. A screen displays the serial number and software version.
2. Press **ENT**. A screen displays the hardware version and MAC address.
3. Press **ENT**. A screen displays the configuration version number.
4. Press **ESC**, or wait approximately 10 seconds, to return to the Main screen.

Changing Battery Capacity Rating in the ACU+

To change the battery capacity setting of the ACU+ to match the battery connected to the power system, perform the following procedure.

PROCEDURE

1. With the Main screen displayed, press **ENT** to go to the Main Menu. Navigate to and select **"Settings"** (**ENT**).
2. If a password screen opens, a password must be entered to allow the User to make adjustments. If a password was previously entered and has not yet timed out, skip this step and proceed to step 3). Otherwise, to enter a password, with the cursor at the User Name field (default is "Admin"), press the down arrow key to move cursor down to the password line. Press **ENT**. "0" is highlighted. Press the up arrow key once to change the "0" to "1"

(default password is "1"), then press **ENT** twice. (**Note:** If you have been assigned a unique User Name and password, follow this procedure to enter these.)

3. With the Settings menu screen displayed, navigate to and select **"Battery"** (**ENT**) / **"Basic"** (**ENT**).
4. Navigate to **"Rated Capacity"**. Press **ENT**. Use the up or down keys to adjust the value as required. Press **ENT**.

Note: The default capacity value is 120 Ah per battery string for the Emerson provided Battery Cabinet. For customer provided batteries, enter the C10 battery capacity rating in Ah.

5. Return to the Main screen by repeatedly pressing **ESC** (escape).

Checking Basic System Settings

Navigate through the controller menus and sub-menus to check system settings. You can adjust any parameter as required. Note that these settings can also be checked (and changed if required) via the WEB Interface.

Note: Repeatedly press the "ESC" key to return in reverse order level by level from any sub-menu until the Main screen appears.

PROCEDURE

To Select a Sub-Menu:

Press the up or down arrow keys to move the cursor up and down the list of sub-menus in the menu screen (selects the sub-menu), then press **ENT** to enter the selected sub-menu.

To Enter a Password:

If a password screen opens, a password must be entered to allow the User to make adjustments. To enter a password, with the cursor at the User Name field (default is "Admin"), press the down arrow key to move cursor down to the password line. Press **ENT**. "0" is highlighted. Press the up arrow key once to change the "0" to "1" (default password is "1"), then press **ENT** twice. (**Note:** If you have been assigned a unique User Name and password, follow this procedure to enter these.)

To Change a Parameter:

Press the up or down arrow keys to move the cursor up and down the list of parameters in the menu screen (selects the parameter to change), then press **ENT** to change the selected parameter. The parameter field highlights. Press the up or down arrow keys to change the parameter value. Press **ENT** to confirm the change.

Table 3 shows the menu navigation for some basic settings. (Refer to the ACU+ Controller Operation Instructions (UM1M820NNB-2) for details and additional settings.)

Table 3. ACU+ Controller Basic Settings Local Menu Navigation

Parameter	Menu Navigation
Date	Main Menu / Settings / Controller / Date
Time	Main Menu / Settings / Controller / Time
IP Communications Parameters (IP address, subnet mask address, gateway address)	Main Menu / Settings / Communication
Float Voltage	Main Menu / Settings / Battery / Charge / Output Voltage
Equalize Voltage	Main Menu / Settings / Battery / Charge / EQ Voltage
Battery Capacity	Main Menu / Settings / Battery / Basic / Ttl Rated Capac
BTRM Feature	Main Menu / Settings / Battery / Basic / BTRM Action Main Menu / Settings / Battery / Basic / BTRM Voltage
Temperature Compensation Center Temperature	Main Menu / Settings / Battery / Temp Comp / Temp Comp Ref.
Temperature Compensation Slope	Main Menu / Settings / Battery / Temp Comp / Temp Comp Coeff
Temperature Compensation Sensor	Main Menu / Settings / Battery / Temp Comp / Temp Comp Probe
HVSD Limit	Main Menu / Settings / Rectifier / All Rect Set / HVSD Limit
Rectifier Current Limit	Main Menu / Settings / Rectifier / All Rect Set / Input Current Lmt
Over Voltage Alarm 1	Main Menu / Settings / Power System / Over Voltage 1
Over Voltage Alarm 2	Main Menu / Settings / Power System / Over Voltage 2
Under Voltage Alarm 1	Main Menu / Settings / Power System / Under Voltage 1
Under Voltage Alarm 2	Main Menu / Settings / Power System / Under Voltage 2

Configuring the ACU+ Identification of Rectifiers

When rectifier modules are all installed prior to applying power and starting the system, the order in which the ACU+ identifies the rectifiers is by serial number (lowest serial number is Rect 1, next lowest is Rect 2, etc.). If you prefer the ACU+ to identify the rectifiers by position in the system, perform the following procedure.

PROCEDURE

1. With the Main screen displayed, press **ENT** to go to the Main Menu. Navigate to and select **"Settings"** (**ENT**).
2. If a password screen opens, a password must be entered to allow the User to make adjustments. If a password was previously entered and has not yet timed out, skip this step and proceed to step 3). Otherwise, to enter a password, with the cursor at the User Name field (default is "Admin"), press the down arrow key to move cursor down to the password line. Press **ENT**. "0" is highlighted. Press the up arrow key once to change the "0" to "1" (default password is "1"), then press **ENT** twice. (*Note: If*

you have been assigned a unique User Name and password, follow this procedure to enter these.)

3. With the Settings menu screen displayed, navigate to and select **"Rectifier"** (**ENT**).
4. Navigate to **"Rect #"** (# is used here to represent the rectifier identification number). Press **ENT**. The rectifier # menu screen is displayed, and the green LED on one rectifier starts flashing. This is the rectifier currently identified by the ACU+ as rectifier #. (If this is not the rectifier you want, press **ESC** to return to rectifier menu screen and select a different rectifier.)
5. Navigate to and select **"Rectifier ID"**. Press **ENT**. Use the up or down keys to change the ACU+ identification number for the flashing rectifier. Press **ENT**.
6. Press **ESC** to return to rectifier menu screen.
7. Repeat steps 4) through 6) for each of the remaining rectifiers in the system.

8. When you have finished selecting identification numbers for all rectifiers, repeatedly press **ESC** to return to the Main Menu.
 9. Navigate to and select **"Manual"** (ENT) / **"Rectifier"** (ENT) / **"All Rect Ctrl"** (ENT).
 10. Navigate to **"Confirm ID/PH"**. Press **ENT**. **"Yes"** highlights.
 11. Press **ENT** to select the operation. Press **ENT** again to confirm.
- Note:** Check your numbering to be sure it is correct. If there where conflicts in your numbering, rectifiers with conflicts will be assigned the next available sequential number.
12. Return to the Main screen by repeatedly pressing **ESC** (escape).

Checking the EPO (Emergency Power Off) Circuit (if connected)

EPO (Emergency Power Off) Function

The Power Module/Bay has an Emergency Power Off (EPO) function operated by a remote contact provided by the User.

When the EPO switch is momentarily closed, the main AC input circuit breaker located on the power and control section of the Power Module/Bay and the battery disconnect circuit breakers (if connected to the BATT1 CTRL, BATT2 CTRL, BATT3 CTRL, and/or BATT4 CTRL connectors located on the rear of the power and control section of the Power Module/Bay) are tripped open to isolate the system from all electrical sources. Manual intervention is required to restart the system. Restart the system by first turning ON the main AC input circuit breaker then the battery circuit breaker(s).

PROCEDURE

1. With the system operating, momentarily depress the customer furnished Emergency Power Off switch.
2. Verify that the main AC input circuit breaker located on the power and control section of the Power Module/Bay and any connected battery circuit breakers open.
3. Restart the system by first turning ON the main AC input circuit breaker then the battery circuit breaker(s).







Checking System Status

PROCEDURE

1. Observe the status of the indicators located on the ACU+ controller, rectifier modules, and power and control

section of the Power Module/Bay. If the system is operating normally, the status of these is as shown in Table 4.

Table 4. Status and Alarm Indicators

Component	Indicator		Normal State
ACU+ Controller	Status (Green)		On
	Information (Yellow)		Off
	Warning or Critical Alarm (Red)		Off
Rectifier Modules	Power (Green)		On
	Protection (Yellow)		Off
	Alarm (Red)		Off
Power and Control Section of Power Module/Bay	Output Voltage Present (Green)		On
	Control Voltage Present Indicator (Green)		On
	Ground/Insulation Fault Alarm (Red)		Off

Final Steps

PROCEDURE

1. If any ACU+ Controller configuration settings were changed, refer to the ACU+ User Instructions (UM1M820NNB-2) and save a copy of the configuration file. This file can be used to restore the ACU+ Controller settings, if required, at a later date.
 - Note that provided on a USB drive furnished with the system is an ACU+ configuration drawing (C-drawing) and the ACU+ configuration files loaded into the ACU+ as shipped.
2. Verify there are no external alarms and the local indicators are as shown in Table 4.

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Customer Service (Pre-Shipment)

Email	CustomerService.ESNA@Emerson.com	Pricing and availability ^[1,2] , purchase orders, expediting requests and order tracking. Ask for your company's dedicated Customer Service Associate.
Phone	1.800.800.1280 option 2	

Customer Support Center (Post-Shipment)

Email	ESNACustomerSupportCenter@Emerson.com	After an order has shipped, contact our Customer Support Center with related questions, concerns or claims.
Phone	1.956.661.6867	

Account Management

Email	AccountManagement.ESNA@Emerson.com	Provides quotes and bid responses for custom configured ^[2] DC power systems and outside plant enclosures for customers and channel partners (Reps, VARs & Distributors).
Phone	1.800.800.1280 option 3	

Spare Parts

Email	DCpower.Spares@Emerson.com OSP.Spares@Emerson.com	Pricing and purchase orders for spare parts, including but not limited to breakers, cables, fuses, rectifier fans, misc. breaker and fuse panels, enclosure fans, doors and switches, etc.
Phone	1.800.800.1280 option 5	

DC Power Depot Repair

Email	DCpower.Repair@Emerson.com	Creates and processes RMAs for depot repair and refurbishment. Determines repair and refurbishment lead times and pricing based on warranties/contractual agreements. Provides repair shipping information and status.
Phone	1.800.800.1280 option 6	

Technical Support

Email	DCpower.TAC@Emerson.com OSP.TAC@Emerson.com	Answers technical product and system questions; determines status of warranties and contractual agreements for repair.
Phone	1.800.800.5260	

^[1] Contact Account Management for custom-configurations.

^[2] Contact Spare Parts for parts and accessories.

For More Information

To learn more about service offerings from Emerson Network Power, please contact your sales representative, call 1-800-800-1280 option 7, email ES.Services@Emerson.com or visit EmersonNetworkPower.com/EnergySystems.

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Technical Support

Contact your sales representative.		Provides quotes and bid responses, order placement and scheduling for design, and deployment and optimization services. Download service & maintenance reports online.
Freedom Care	EmersonNetworkPower.com	

EMEA Customer Support Center

Email	ESEMEACustomerSupportCenter@Emerson.com	Dealing with customer problems related to: <ul style="list-style-type: none">• Product field performance• Product quality defects• Product dead on arrival• Incomplete or incorrect deliveries• Quality and product support
Phone	+421 32 7700 888	

Order DC Power & OSP, Order Status

Email	OPC.EES@EmersonNetworkPower.com	Creates and processes orders, determines lead times and pricing, provides order shipping information and status.
Phone	+421 32 7700 706	

Request DC Power Repair Service RMA

Email	EMEA.HWServices@Emerson.com	Creates and processes RMAs, determines lead times and pricing, provides repair shipping information and status.
Phone	+421 32 7700 191	

Spare Parts

Email	EMEA.HWServices@Emerson.com	Pricing and PO processing of spare parts, including but not limited to breakers, cables, fuses, rectifier fans, misc. breaker and fuse panels, enclosure fans, doors & switches, etc.
Phone	+421 32 7700 881	

DC Power Product Training

Email	EMEA.Training@emersonenergy.com	Requests for quotes, order placement and scheduling.
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For More Information

To learn more about service offerings from Emerson Network Power, please contact your sales representative, or visit EmersonNetworkPower.eu/EnergySystems.

NetSure™ 9500 120kW 400V DC Power System

Installation Manual, IM584001200 (Issue AA, April 14, 2014)



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